

SEQUENCE LISTING

<110> Chapple, Clinton

Franke, Rochus

Ruegger, Maxwell

<120> Genes Encoding P-Coumarate 3-Hydroxylase (C3H) and Methods of Use

<130> N1422-005

<150> US 60/225554

<151> 2000-08-16

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<170> PatentIn version 3.0

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 35 40 45
 Arg Cys Tyr Tyr Glu Trp Ala Gln Ser Tyr Gly Pro Ile Ile Ser Val
 50 55 60
 Trp Ile Gly Ser Ile Leu Asn Val Val Val Ser Ser Ala Glu Leu Ala
 65 70 75 80
 Lys Glu Val Leu Lys Glu His Asp Gln Lys Leu Ala Asp Arg His Arg
 85 90 95
 Asn Arg Ser Thr Glu Ala Phe Ser Arg Asn Gly Gln Asp Leu Ile Trp
 100 105 110
 Ala Asp Tyr Gly Pro His Tyr Val Lys Val Arg Lys Val Cys Thr Leu
 115 120 125
 Glu Leu Phe Thr Pro Lys Arg Leu Glu Ser Leu Arg Pro Ile Arg Glu
 130 135 140
 Asp Glu Val Thr Ala Met Val Glu Ser Val Phe Arg Asp Cys Asn Leu
 145 150 155 160
 Pro Glu Asn Arg Ala Lys Gly Leu Gln Leu Arg Lys Tyr Leu Gly Ala
 165 170 175
 Val Ala Phe Asn Asn Ile Thr Arg Leu Ala Phe Gly Lys Arg Phe Met
 180 185 190
 Asn Ala Glu Gly Val Val Asp Glu Gln Gly Leu Glu Phe Lys Ala Ile
 195 200 205

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Val	Gln	Gln	Lys	Val	Gln	Glu	Glu	Phe	Asp	Arg	Val	Val	Gly	Leu	Asp	
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Arg	Ile	Leu	Thr	Glu	Ala	Asp	Phe	Ser	Arg	Leu	Pro	Tyr	Leu	Gln	Cys	
			340					345					350			
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Ala	Val	Trp	Lys	Asn	Pro	Phe	Glu	Phe	Arg	Pro	Glu	Arg	Phe	Leu	Glu	
				405					410					415		
Glu	Asp	Val	Asp	Met	Lys	Gly	His	Asp	Phe	Arg	Leu	Leu	Pro	Phe	Gly	
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Ala	Gly	Arg	Arg	Val	Cys	Pro	Gly	Ala	Gln	Leu	Gly	Ile	Asn	Leu	Val	
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Thr	Ser	Met	Met	Ser	His	Leu	Leu	His	His	Phe	Val	Trp	Thr	Pro	Pro	
	450					455					460					
Gln	Gly	Thr	Lys	Pro	Glu	Glu	Ile	Asp	Met	Ser	Glu	Asn	Pro	Gly	Leu	
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Val	Thr	Tyr	Met	Arg	Thr	Pro	Val	Gln	Ala	Val	Ala	Thr	Pro	Arg	Leu	
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<213> Arabidopsis thaliana

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Arg Cys Tyr Tyr Glu Trp Ala Gln Ser Tyr Gly Pro Ile Ile Ser Val
 50 55 60

Trp Ile Gly Ser Ile Leu Asn Val Val Val Ser Ser Ala Glu Leu Ala
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Lys Glu Val Leu Lys Glu His Asp Gln Lys Leu Ala Asp Arg His Arg
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Asn Arg Ser Thr Glu Ala Phe Ser Arg Asn Gly Gln Asp Leu Ile Trp
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Ala Asp Tyr Gly Pro His Tyr Val Lys Val Arg Lys Val Cys Thr Leu
 115 120 125

Glu Leu Phe Thr Pro Lys Arg Leu Glu Ser Leu Arg Pro Ile Arg Glu
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Asp Glu Val Thr Ala Met Val Glu Ser Val Phe Arg Asp Cys Asn Leu
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Pro Glu Asn Arg Ala Lys Gly Leu Gln Leu Arg Lys Tyr Leu Gly Ala
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Val Ala Phe Asn Asn Ile Thr Arg Leu Ala Phe Gly Lys Arg Phe Met
 180 185 190

Asn Ala Glu Gly Val Val Asp Glu Gln Gly Leu Glu Phe Lys Ala Ile
 195 200 205

Val	Ser	Asn	Gly	Leu	Lys	Leu	Gly	Ala	Ser	Leu	Ser	Ile	Ala	Glu	His	210	215	220	
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Glu	His	Gly	Ala	Arg	Arg	Asp	Arg	Leu	Thr	Arg	Ala	Ile	Met	Glu	Glu	245	250	255	
His	Thr	Leu	Ala	Arg	Gln	Lys	Ser	Ser	Gly	Ala	Lys	Gln	His	Phe	Val	260	265	270	
Asp	Ala	Leu	Leu	Thr	Leu	Lys	Asp	Gln	Tyr	Asp	Leu	Ser	Glu	Asp	Thr	275	280	285	
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Val	Gln	Gln	Lys	Val	Gln	Glu	Glu	Phe	Asp	Arg	Val	Val	Gly	Leu	Asp	325	330	335	
Arg	Ile	Leu	Thr	Glu	Ala	Asp	Phe	Ser	Arg	Leu	Pro	Tyr	Leu	Gln	Cys	340	345	350	
Val	Val	Lys	Glu	Ser	Phe	Arg	Leu	His	Pro	Pro	Thr	Pro	Leu	Met	Leu	355	360	365	
Pro	His	Arg	Ser	Asn	Ala	Asp	Val	Lys	Ile	Gly	Gly	Tyr	Asp	Ile	Pro	370	375	380	
Lys	Gly	Ser	Asn	Val	His	Val	Asn	Val	Trp	Ala	Val	Ala	Arg	Asp	Pro	385	390	395	400
Ala	Val	Trp	Lys	Asn	Pro	Phe	Glu	Phe	Arg	Pro	Glu	Arg	Phe	Leu	Glu	405	410	415	
Glu	Asp	Val	Asp	Met	Lys	Gly	His	Asp	Phe	Arg	Leu	Leu	Pro	Phe	Gly	420	425	430	
Ala	Gly	Arg	Arg	Val	Cys	Pro	Gly	Ala	Gln	Leu	Asp	Ile	Asn	Leu	Val	435	440	445	
Thr	Ser	Met	Met	Ser	His	Leu	Leu	His	His	Phe	Val	Trp	Thr	Pro	Pro	450	455	460	
Gln	Gly	Thr	Lys	Pro	Glu	Glu	Ile	Asp	Met	Ser	Glu	Asn	Pro	Gly	Leu	465	470	475	480
Val	Thr	Tyr	Met	Arg	Thr	Pro	Val	Gln	Ala	Val	Ala	Thr	Pro	Arg	Leu	485	490	495	

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 35 40 45

Ala Lys Glu Val Leu Lys Glu His Asp Gln Lys Leu Ala Asp Arg His
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Arg Asn Arg Ser Thr Glu Ala Phe Ser Arg Asn Gly Gln Asp Leu Ile
 65 70 75 80

Trp Ala Asp Tyr Gly Pro His Tyr Val Lys Val Arg Lys Val Cys Thr
 85 90 95

Leu Glu Leu Phe Thr Pro Lys Arg Leu Glu Ser Leu Arg Pro Ile Arg
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Glu Asp Glu Val Thr Ala Met Val Glu Ser Val Phe Arg Asp Cys Asn
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Leu Pro Glu Asn Arg Ala Lys Gly Leu Gln Leu Arg Lys Tyr Leu Gly
 130 135 140

Ala Val Ala Phe Asn Asn Ile Thr Arg Leu Ala Phe Gly Lys Arg Phe
 145 150 155 160

Met Asn Ala Glu Gly Val Val Asp Glu Gln Gly Leu Glu Phe Lys Ala
 165 170 175

Ile Val Ser Asn Gly Leu Lys Leu Gly Ala Ser Leu Ser Ile Ala Glu
 180 185 190

His Ile Pro Trp Leu Arg Trp Met Phe Pro Ala Asp Glu Lys Ala Phe
 195 200 205

Ala Glu His Gly Ala Arg Arg Asp Arg Leu Thr Arg Ala Ile Met Glu
 210 215 220

Glu His Thr Leu Ala Arg Gln Lys Ser Ser Gly Ala Lys Gln His Phe
 225 230 235 240

Val Asp Ala Leu Leu Thr Leu Lys Asp Gln Tyr Asp Leu Ser Glu Asp
 245 250 255

Thr Ile Ile Gly Leu Leu Trp Asp Met Ile Thr Ala Gly Met Asp Thr
 260 265 270

Thr Ala Ile Thr Ala Glu Trp Ala Met Ala Glu Met Ile Lys Asn Pro
 275 280 285

Arg Val Gln Gln Lys Val Gln Glu Glu Phe Asp Arg Val Val Gly Leu
 290 295 300

Asp Arg Ile Leu Thr Glu Ala Asp Phe Ser Arg Leu Pro Tyr Leu Gln
 305 310 315 320

Cys Val Val Lys Glu Ser Phe Arg Leu His Pro Pro Thr Pro Leu Met
 325 330 335

Leu Pro His Arg Ser Asn Ala Asp Val Lys Ile Gly Gly Tyr Asp Ile
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Pro Lys Gly Ser Asn Val His Val Asn Val Trp Ala Val Ala Arg Asp
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Pro Ala Val Trp Lys Asn Pro Phe Glu Phe Arg Pro Glu Arg Phe Leu
 370 375 380

Glu Glu Asp Val Asp Met Lys Gly His Asp Phe Arg Leu Leu Pro Phe
 385 390 395 400

Gly Ala Gly Arg Arg Val Cys Pro Gly Ala Gln Leu Gly Ile Asn Leu
 405 410 415

Val Thr Ser Met Met Ser His Leu Leu His His Phe Val Trp Thr Pro
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Pro Gln Gly Thr Lys Pro Glu Glu Ile Asp Met Ser Glu Asn Pro Gly
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Arg	Asn	Arg	Ser	Thr	Glu	Ala	Phe	Ser	Arg	Asn	Gly	Gln	Asp	Leu	Ile	65	70	75	80
Trp	Ala	Asp	Tyr	Gly	Pro	His	Tyr	Val	Lys	Val	Arg	Lys	Val	Cys	Thr	85	90	95	
Leu	Glu	Leu	Phe	Thr	Pro	Lys	Arg	Leu	Glu	Ser	Leu	Arg	Pro	Ile	Arg	100	105	110	
Glu	Asp	Glu	Val	Thr	Ala	Met	Val	Glu	Ser	Val	Phe	Arg	Asp	Cys	Asn	115	120	125	
Leu	Pro	Glu	Asn	Arg	Ala	Lys	Gly	Leu	Gln	Leu	Arg	Lys	Tyr	Leu	Gly	130	135	140	
Ala	Val	Ala	Phe	Asn	Asn	Ile	Thr	Arg	Leu	Ala	Phe	Gly	Lys	Arg	Phe	145	150	155	160
Met	Asn	Ala	Glu	Gly	Val	Val	Asp	Glu	Gln	Gly	Leu	Glu	Phe	Lys	Ala	165	170	175	
Ile	Val	Ser	Asn	Gly	Leu	Lys	Leu	Gly	Ala	Ser	Leu	Ser	Ile	Ala	Glu	180	185	190	
His	Ile	Pro	Trp	Leu	Arg	Trp	Met	Phe	Pro	Ala	Asp	Glu	Lys	Ala	Phe	195	200	205	
Ala	Glu	His	Gly	Ala	Arg	Arg	Asp	Arg	Leu	Thr	Arg	Ala	Ile	Met	Glu	210	215	220	
Glu	His	Thr	Leu	Ala	Arg	Gln	Lys	Ser	Ser	Gly	Ala	Lys	Gln	His	Phe	225	230	235	240
Val	Asp	Ala	Leu	Leu	Thr	Leu	Lys	Asp	Gln	Tyr	Asp	Leu	Ser	Glu	Asp	245	250	255	

Thr Ile Ile Gly Leu Leu Trp Asp Met Ile Thr Ala Gly Met Asp Thr
 260 265 270

Thr Ala Ile Thr Ala Glu Trp Ala Met Ala Glu Met Ile Lys Asn Pro
 275 280 285

Arg Val Gln Gln Lys Val Gln Glu Glu Phe Asp Arg Val Val Gly Leu
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Asp Arg Ile Leu Thr Glu Ala Asp Phe Ser Arg Leu Pro Tyr Leu Gln
 305 310 315 320

Cys Val Val Lys Glu Ser Phe Arg Leu His Pro Pro Thr Pro Leu Met
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Leu Pro His Arg Ser Asn Ala Asp Val Lys Ile Gly Gly Tyr Asp Ile
 340 345 350

Pro Lys Gly Ser Asn Val His Val Asn Val Trp Ala Val Ala Arg Asp
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Pro Ala Val Trp Lys Asn Pro Phe Glu Phe Arg Pro Glu Arg Phe Leu
 370 375 380

Glu Glu Asp Val Asp Met Lys Gly His Asp Phe Arg Leu Leu Pro Phe
 385 390 395 400

Gly Ala Gly Arg Arg Val Cys Pro Gly Ala Gln Leu Asp Ile Asn Leu
 405 410 415

Val Thr Ser Met Met Ser His Leu Leu His His Phe Val Trp Thr Pro
 420 425 430

Pro Gln Gly Thr Lys Pro Glu Glu Ile Asp Met Ser Glu Asn Pro Gly
 435 440 445

Leu Val Thr Tyr Met Arg Thr Pro Val Gln Ala Val Ala Thr Pro Arg
 450 455 460

Leu Pro Ser Asp Leu Tyr Lys Arg Val Pro Tyr Asp Met
 465 470 475